i) a substrate with a surface comprising a plurality of assay locations, each assay location comprising an array location comprising a plurality of discrete sites; and

ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent, wherein said microspheres are distributed on said surface such that said discrete sites each contain no more than one microsphere; and

b) determining the presence or absence of said target analyte.

19. (Twice Amended) A method of determining the presence of one or more target analytes in one or more samples comprising:

a) adding said one or more samples to a first substrate comprising a plurality of assay locations, such that said sample is contained at a plurality of said assay locations;

b) contacting said sample with a second substrate comprising:

i) a plurality of array locations, each array location comprising a plurality of discrete sites, wherein at least one assay location is in fluid contact with at least one array location; and

ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent, wherein said microspheres are distributed on at least one of said array locations such that said discrete sites each contain no more than one microsphere; and

c) determining the presence or absence of said target analyte.

20. (Twice Amended) A method according to claim 18, wherein each of said assay locations comprises a library of bioactive agents.

21. (Amended) A method according to claim 18, wherein said substrate is a microtiter plate and each assay location is a microtiter well.

22. (Amended) A method according to claim 18, wherein each discrete site is a bead well.

23. (Amended) A method according to claim 18, wherein each of said subpopulations further comprise an optical signature capable of identifying said bioactive agent.

24. (Twice Amended) A method according to claim 18, wherein at least a first and second microsphere in said subpopulations further comprise an identifier binding ligand that will bind a decoder binding ligand, whereby said bioactive agent is identified by said identifier binding ligand binding to said decoder binding ligand.

25. (Amended) A method according to claim 19, wherein said first substrate is a microtiter plate.

26. (Amended) A method according to claim 19 or 25, wherein said second substrate comprises a plurality of fiber optic bundles comprising a plurality of individual fibers, each bundle comprising an array location, and each individual fiber comprising a bead well.

27. (Amended) A method according to claim 19, wherein each of said subpopulations further comprise an optical signature capable of identifying said bioactive agent.

28. (Amended) A method according to claim 19, wherein each of said subpopulations further comprise an identifier binding ligand that will bind a decoder binding ligand such that the identification of the bioactive agent can be elucidated.

29. (Amended) A method according to claim 18 or 19, wherein at least one of said target analytes is a nucleic acid.

Please add Claims 35 and 36:

35. (New) A method of determining the presence of one or more target analytes in one or more samples comprising:

a) contacting said one or more samples with a composition comprising:

i) a composite array comprising a plurality of assay locations, each assay location comprising an array location comprising a plurality of discrete sites; and

ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent, wherein said microspheres are distributed on said surface such that said discrete sites each contain no more than one microsphere; and

b) determining the presence or absence of said target analyte.

36. (New) A method of determining the presence of one or more target analytes in one or more samples comprising:

a) adding said one or more samples to a first substrate comprising a plurality of assay locations, such that said sample is contained at a plurality of said assay locations;

b) contacting said sample with a second substrate comprising:

i) a composite array comprising a plurality of array locations, each array location comprising a plurality of discrete sites, wherein at least one assay location is in fluid contact with at least one array location; and

ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent, wherein said microspheres are distributed on said surface such that said discrete sites each contain no more than one microsphere; and

c) determining the presence or absence of said target analyte.--